Trajectory of Anxiety, Depression and Quality of Life in Ankylosing Spondylitis: A Descriptive Study

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ABSTRACT
Objective: To investigate anxiety, depression, and health-related quality of life (HRQoL) over 15 years and associations between demographic, disease-related variables, anxiety and depression, and HRQoL in patients with AS.
Study Design: Descriptive study.
Place and Duration of the Study: Istanbul Medeniyet University Goztepe Prof. Dr. Suleymsan Yalcin City Hospital, from June to December 2021.
Methodology: Seventy-five patients with AS, who were followed up in Physical Medicine and Rehabilitation outpatient clinic for 15 years, were included in this study, after their diagnosis was confirmed by the hospital system. The demographic information (gender, age, accommodation status, educational status, employment status, and time unemployed), diagnosis time, remission time, drugs used, usage of TNF-inhibitor drugs and duration of usage were recorded. Bath ankylosing spondylitis disease activity index (BASDAI) was used to the measure the disease activity, the hospital anxiety depression scale (HADS) was used for anxiety and depression screening and Short Form-36 (SF-36) was used for HRQoL.
Results: SF-36 physical component summary score, general health, social functioning, and role limitations due to physical health subscale scores improved significantly (p=0.004; p<0.000; p=0.024; p=0.002, respectively). It was observed that the effects of BASDAI, HADS anxiety and depression scores were significant on SF-36 (p=0.044; p=0.050; p=0.023), and time has a substantial impact on SF-36 (p=0.003). The effects of gender, education level, and occupation were not found statistically significant (p>0.05 for each).
Conclusion: Within 15 years, quality of life increased, anxiety and depression decreased in AS patients. Along with disease activity, anxiety and depression were found to be the most important factors affecting the change in quality of life over time.

Key Words: Ankylosing spondylitis, Anxiety, Depression, Disease activity, Quality of life.

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INTRODUCTION

Ankylosing spondylitis (AS) is a systemic, chronic, and inflammatory rheumatic disease of uncertain etiology, affecting the spine and sacroiliac joints.[1] AS can significantly affect the lives of patients physically, psychologically, and socially due to movement limitations, pain and fatigue.[2] Sometimes the disease can even result in disability and loss of workforce.[3-5]

The most important goal of AS management is to control inflammation, maintain functional well-being, and maximise the long-term health-related quality of life (HRQoL).

Little is known about the relationships between demographic and disease-related variables and HRQoL in patients with AS, especially after the introduction of new and more targeted medicines.[6] Therefore, comprehensive investigation of HRQoL, its trajectory, and its determinants is necessary before aiming to improve health-related quality of life.

Sousa *et al*.[7] found that adults in the general population with anxiety and/or depression are more likely to report lower quality of life.[7] However, studies analysing this association are still scarce. Several studies have also shown that mental health is affected in AS, including an increased risk of depression and anxiety compared to the general population.[8,9] The relationship between disease severity and depression, and between the quality of life and depression and anxiety have been reported, indicating the potential effects of mental health in AS management and, consequently, on quality of life.[10]

There is evidence in the literature about poor quality of life and determinants of quality of life in AS. However, to the best of the authors' knowledge, there is no study investigating the change in quality of life over time and the factors affecting this change.

Therefore, this is the first study to temporally examine the quality of life in this patient group.

This study aimed to investigate trajectories of anxiety, depression, and HRQoL over the years and associations between demographic, disease-related variables, anxiety and depression, and HRQoL in patients with AS.

METHODOLOGY

Seventy-five patients with AS who were followed up in physical medicine and rehabilitation outpatient clinic, for Istanbul Medeniyet University Goztepe Prof Dr Suleymsan Yalcin City Hospital for 15 years were included in the study. The current diagnoses of the people were checked and their phone numbers were obtained from the hospital ınformation management system. Patients with diagnosis of AS, using ICD 9 code 343.x or ICD 10 code M45 were included in the study.

The phone numbers of the patients registered in the system were accessed and the patients were reached by phone. Those with missing information in the follow-up file, who did not have a definitive diagnosis of AS, and who did not want to answer, or could not be reached, were excluded from the study.

The medical ethics committee of the university hospital approved the study by the Declaration of Helsinki (Decision number: 2021/0367). All patients consented to the use of their anonymised data for scientific purposes.

The demographic information (gender, age, accommodation status, educational status, employment status, time unemployed) were questioned. Past data were obtained from the patient files. Employment status was divided into three groups as physically demanding jobs, relatively sedantary jobs and unemployed.

The type of accommodation was divided as alone, and with family, and with caregiver. The patients were diagnosed 15 years ago according to the modified New York criteria.[11] Diagnosis time, remission time, drugs used, usage of TNF inhibitor drugs, and duration of usage were recorded.

The bath ankylosing spondylitis disease activity ındex (BASDAI) was used to measure disease activity. BASDAI is a self-administered instrument with six questions, involving individual domains of fatigue, spinal pain, joint pain and swelling, areas of local tenderness, and morning stiffness. Each item has a 10-cm horizontal visual analogue scale (VAS) from 0 (none) to 10 (very severe). Item 6 (morning stiffness, duration) is measured by a time scale (0–2 h). The summated score of items 5 (morning stiffness and severity), and 6 is converted to a 0–10 scale, with a lower score indicating less disease activity.[12]

Hospital anxiety depression (HAD) scale includes, anxiety and depression subscales, is a self-report scale, and consists of a total of 14 items, 7 of which investigate the symptoms of depression (even numbers) and 7 of which investigate the symptoms of anxiety (odd numbers). The answers are evaluated in a four-point Likert format and are scored between 0-3. The purpose of the scale is not to diagnose, but to determine the risk group by scanning anxiety and depression in a short time in patients with physical illness.[13] Cut-off scores for Turkish society have been determined as 7 for anxiety and 10 for depression.[14]

The patient's quality of life was evaluated with the Turkish version of Short Form 36 (SF-36). The SF-36 is a widely applied generic instrument for measuring health status. It consists of eight dimensions: physical functioning, social functioning, physical role, emotional role, mental health, vitality, bodily pain, and general health perceptions. Scores range from 0 (worst) to 100 (best) with higher scores indicating better health status.[15] The questionnaire is currently translated into Turkish and is widely applied with good reliability and validity in the general population.[16]

The descriptive statistics of the categorical variables in the study are given as numbers and percentages, and the descriptive statistics of the numerical variables are presented as mean and standard deviation. The conformity of the variables to the normal distribution was examined using the Shapiro-Wilk test.

Wilcoxon test and paired sample t-test were used to assess the follow-up difference. Linear Mixed Effects models were performed to identify potential factors associated with changes in quality of life across time. The random effects structure of the final multivariable model was chosen based on the comparison of two models: one model considering only a random intercept and a second model considering both a random intercept and a random slope. The best model was determined random intercept model by AIC and BIC.

Power analysis was performed for the primary variable, and SF-36 sub-scores. When the importance is attributed to the difference of 5.3 units in the mean of the groups (standard deviations 9.0, 8.6), it was determined that a minimum of 45 people should be included in the study with a confidence level of 95% and a power of 80%.[17] The statistical significance level was taken as 0.05 and SPSS 25.0 package program was used in the analysis.

Table I: Baseline characteristics of ankylosing spondylitis patients.

	n (%), mean (SD)
Gender, n (%)	
Male	30 (73.1)
Female	11 (26.8)
Age (years), mean (SD)	41.23 (10.37)
Education status, n (%)	
Primary school	27 (65.9)
High school	12 (29.3)
University	2 (4.9)
Job classification, n (%)	
Relatively sedantery job	9 (21.9)
Physically demanding job	21 (51.21)
Unemployed	11 (26.8)
Time unemployed (years), mean (SD)	1.76 (4.83)
Diagnosis time (years), mean (SD)	12.07 (9.56)
Remission time (years), mean (SD)	1.65 (3.63)
BASDAI, mean (SD)	4.56 (2.27)
TNF inhibitor drug usage	34 (82.9)
Duration of TNF inhibitor drug usage, mean(SD)	4.60 (6.93)
Depression	11 (26.8)
Anxiety	23 (56.0)

Table II: Linear mixed effects model with predictors of Short Form-36.

Parameter	Estimate	Std. Error	p	95% Confidence Interval	
				Lower Bound	Upper Bound
Intercept	100.997	16.853	<.001	67.322	134.671
[gender=1,00]	-8.602	6.561	.194	-21.696	4.491
[gender=2,00]	reference				
[education=1,00]	.320	11.894	.979	-23.409	24.051
[education=2,00]	2.451	10.861	.822	-19.222	24.125
[education=3,00]	reference				
[occupation=1,00]	.260	12.212	.983	-24.115	24.636
[occupation=2,00]	-.270	12.481	.983	-25.186	24.645
[occupation=3,00]	reference				
BASDAI	-1.999	.971	.044	-3.942	-.057
HADS_anxiety	-1.260	.666	.050	-2.590	.069
HADS depression	-1.411	.606	.023	-2.620	-.202
Age	.044	.267	.868	-.489	.578
[time=1]	-11.025	3.594	.003	-18.197	-3.852
[time=2]	reference				
2. Information criteria					
Restricted log likelihood	622.478				
Akaike's information criterion (AIC)	626.478				
Schwarz's bayesian criterion (BIC)	630.946				

RESULTS

Table I shows the descriptive statistics for categorical variables are given as numbers and percentages, and descriptive statistics for numerical variables are given. Thirty-four (82.9%) of the participants were using TNF inhibitor drugs. The mean duration of usage in patients using TNF inhibitor drugs was 4.60 ±6.93 years.

From the first to the final visit, the SF-36 physical component summary score, general health, social functioning, and role limitations due to physical health subscale scores improved significantly (p=0.004; p<0.001; p=0.024; and p=0.002, respectively). Only the subscale score of the emotional well-being score was slightly lower at the final visit (p >0.05). A decrease was found in HADS anxiety and depression scores, but the change was not statistically significant (p>0.05). However, classifying according to the relevant cut-off values, the number of participants with anxiety decreased from 23 to 17, and the number of participants with depressive symptoms increased from 11 to 13.

Following the modelling strategy described in the methods section, the best model was determined random intercept model by AIC and BIC, and the final set of predictors of quality of life are shown in Table II.

It was observed that the effects of BASDAI, HADS anxiety, and depression scores were significant on SF-36 (p=0.044; p=0.050; p=0.023), and time has a substantial impact on SF-36 (p=0.003). The effects of gender, education level, and occupation were not statistically significant (p>0.05 for each).

DISCUSSION

In this study, patients with AS were evaluated temporally and a significant improvement in quality of life was found after 15 years. Disease activity, depression and anxiety were found to be the most important factors in the improvement of quality of life over time.

AS, as a subtype of spondyloarthritis (SpA), is a common inflammatory rheumatic disease with an unknown etiology.[18] AS can have distinct, multidimensional consequences, as the disease begins in young adulthood and develops later in life; varying degrees of functional limitations and disability can accumulate over the years.[5]

The average duration of diagnosis of the participants was 12 years, duration of remission was approximately two years and the mean BASDAI was over 4. Therefore, most of the participants were not in the disease's early years and had lived with active disease for a significant period. Despite the active long-term disease, the quality of life scores of the participants was higher than the literature, even in the baseline assessment.[19]

Nearly half of the participants worked in physically demanding jobs, while the other half were unemployed. There are significant differences in occupation classifications between studies. The classification in this study was made about the physical difficulty that the person may experience while performing the requirements of their occupation. Webers *et al.* found that patients suffering from AS compared to population controls were less likely to be employed.[20] Mastery is an important personal factor associated with employment in patients with AS.[20] Only two of the participants in this study were university graduates. This may be why almost half of the half population was working in physically demanding jobs.

There have been significant developments recently, including awareness of the disease, early detection methods, and treatments. It is expected that these advances

will have economic consequences such as functional improvement and consequent reduction in workforce loss, and social consequences such as reduction in anxiety and depression and increase in the quality of life. In this study, almost all subscores of quality of life after 15 years were found to be improved. The most improved subscores were general health and physical total score. While the improvement in the physical functions of the participants was obvious, there was a decrease in their emotional well-being subscore. It is unclear whether this situation is unique to this study population.

In this study, it is found that higher disease activity, higher anxiety and depression in baseline status predicted lower PCS scores of HRQoL in 15 years. Bodur *et al.* also reported that HRQoL measured by SF-36 was strongly associated with the BASDAI score.[21] The high disease activity and functional limitation have been reported in the literature as the most important predictors of a worse PCS score in AS patients.[2,15] Also, the profound effect of depression and anxiety on HRQoL has been confirmed by literature.[22-24] However, there is no study that investigates the factors affecting the change of HRQoL over time within the authors' knowledge.

There was a decrease in anxiety and depression scores in participants, although it was not statistically significant. Although the depression score decreased, the number of participants with depressive symptoms increased. Baseline depression and anxiety scores were found to be determinants of PCS score. Therefore, specifically, screening and treatment of depression and anxiety symptoms in AS patients may result in a better quality of life in both the short and long term.

There are some limitations of the study. The fact that the sample was taken from a single centre limits the generalisability of the results. In addition, the fact that their information was obtained by phone, some from their caregivers and some from themselves, may have caused some of the data to be inaccurate. Since the time interval is as long as 15 years, many factors that may affect the quality of life of the person may have been missed during this time period. Further studies should be performed in larger populations and at shorter time intervals.

CONCLUSION

The quality of life increased and anxiety and depression decreased in AS patients within 15 years. Disease activity, anxiety, and depression were found to be the most important factors affecting the change in quality of life over time. Healthcare providers should develop effective strategies to change factors that can optimise disease management and improve the quality of life.

ETHICAL APPROVAL:
This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Istanbul Medeniyet University (2021/0367).

PATIENTS' CONSENT:
Informed consent were obtained from patients to publish the data.

COMPETING INTEREST:
The authors have no relevant financial or non-financial interests to disclose.

AUTHORS' CONTRIBUTION:
BDK, AI, SNB, FMO, OP: All authors contributed to the study conception and design. Material preparation, data collection and analysis.
The first draft of the manuscript was written by BDK and all the authors have commented on previous versions of the manuscript.
All authors read and approved the final version of the manuscript to be published.

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